

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
22 April 2004 (22.04.2004)

PCT

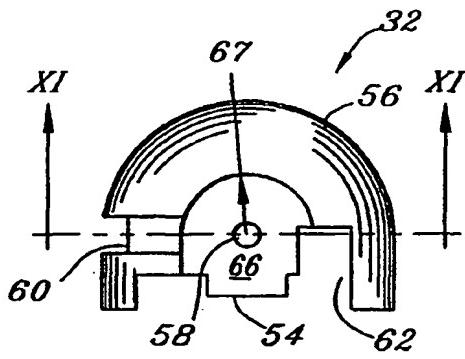
(10) International Publication Number
WO 2004/033982 A1

- | | | |
|---|---|---|
| (51) International Patent Classification ⁷ : | F41A 3/12 | (81) Designated States (<i>national</i>): AE, AU, BA, BR, BZ, CA, CN, CO, CR, DZ, EC, GE, HR, IL, IN, JP, KE, KR, LT, LV, MA, MG, MK, MX, NO, NZ, OM, PH, PL, SD, SG, SY, TN, UA, US, UZ, VN, YU, ZA. |
| (21) International Application Number: | PCT/US2003/030471 | (84) Designated States (<i>regional</i>): Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR). |
| (22) International Filing Date: | 26 September 2003 (26.09.2003) | Published: |
| (25) Filing Language: | English | — with international search report |
| (26) Publication Language: | English | — before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments |
| (30) Priority Data: | 60/417,522 9 October 2002 (09.10.2002) US | <i>For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.</i> |
| (71) Applicant and
(72) Inventor: | MOORE, Wildey, J. [US/US]; 45 Angevine Road, Warren, CT 06794 (US). | |
| (74) Agent: | CRUTCHER, William, C.; McCormick Paulding & Huber, LLP, CityPlace II, 185 Asylum Street, Hartford, CT 06103 (US). | |



WO 2004/033982 A1

(54) Title: FIREARM WITH A READILY INTERCHANGEABLE BOLT FACE



(57) Abstract: A readily replaceable bolt face for a firearm (10) with a movable slide (12) that strips a round from a magazine, extracts the spent round from the firing chamber and then ejects the round from the firearm by means of an ejector. A bolt face insert (32) has an external configuration that is common to a range of calibers, but with a bolt face side (66) designed to fit the rim of a specific caliber or calibers having the same rim dimension. The insert may be replaced to fit a different caliber without replacing the slide. The bolt face insert is provided with a slot (62) for the ejector and a groove (60) to accept an extractor for the specified caliber.

FIREARM WITH A READILY INTERCHANGEABLE BOLT FACE

Cross Reference to Related Applications

This application claims the benefits of prior filed, co-pending U.S. provisional patent application Serial No. 60/417,522 filed on October 9, 2002.

Technical Field

This invention relates to an improved construction for a firearm, particularly a hand held repeater of semi-automatic or automatic design. More particularly, it relates to an improved construction for a firearm of the type having a longitudinally movable slide on the frame with a bolt face that feeds cartridges from a magazine and ejects spent casings.

Background Art

Hand held repeaters are known in the prior art of a semi-automatic or automatic design, having a bolt or movable slide that strips a round from a magazine. The slide or bolt is driven to the rear from its battery position upon firing, extracting the spent round from the firing chamber, which is then ejected from the firearm by means of an ejector. The bolt face or slide face is engineered to encapsulate the base or rim of a specific round, determined by the diameter of the rim for safety and function purposes.

This invention relates in general to the construction of firearms and, in particular, to the construction of the bolt or slide area called the face.

Typically, this face area is manufactured as an integral part of the bolt or slide, restricting the use of these major components to a specific caliber or calibers having the same rim dimension. Other components frequently can be used in the manufacture of firearms of the same basic type, the difference being the caliber, magazine capacity, sighting arrangements or other features where the same slide or bolt could be used except for their being restricted to a specific

caliber by the bolt or slide face area.

The invention takes into the account the high cost of manufacturing the slide or bolt as a component, the need to decrease inventory cost where other components are utilized in the production of a variety of firearms and the inventory of slides needs to be kept high to accommodate the varying demands, the need of militaries to inventory a variety of caliber firearms for special purposes, the cost of replacing firearms with new ones, should a new caliber be desired as a replacement and the desire of an end user to be able to change calibers for different shooting applications.

Accordingly, one object of the present invention is to provide a simplified firearm construction having a readily interchangeable bolt face.

Another object of the invention is to provide a simplified construction for an interchangeable bolt face insert.

Another object of the invention is to provide an improved firearm construction which reduces the cost of the spare parts inventory.

Another object of the invention is to provide an improved firearm, whose slide or bolt may readily be converted to use a different caliber cartridge.

20 Disclosure of Invention

Briefly stated, the invention uses a slide with the area normally associated with the face removed from this component and a recess cut into the slide for the insertion of an independent part referred to as an interchangeable bolt face insert. The bolt face insert is designed so that its outside dimension is common to the area removed from the slide for its insertion. Its inside dimension however, is manufactured to accommodate a specific cartridge base or rim dimension and cut to accept an extractor (its retainer) of the proper length, to extract the cartridge that it is designed to encapsulate. By inserting the proper interchangeable bolt face and extractor, the slide now becomes versatile to the use of a wide variety of cartridges. In the case of a firearm

utilizing a slide, one need only install a barrel of the desired caliber with its compatible interchangeable bolt face, the proper extractor and a magazine to shoot a specific caliber. Barrels are required to have the same outside dimensions, caliber-to-caliber, to mate with their working surfaces in the slide.

- 5 In the case of a firearm not utilizing a slide, but a movable bolt, the same method of insertion and retention are utilized.

The invention is practiced by providing an improved bolt face for a firearm of the type having a frame, a barrel having a bore adapted to receive a cartridge of a selectable caliber disposed in the frame, a slide or bolt arranged to move longitudinally between a forward and a rearward position with respect to the frame and the barrel, the slide or bolt defining a breechblock portion having a longitudinal hole therethrough and a longitudinally spaced ejection chamber, a firing pin longitudinally slidable in the longitudinal hole to enable it to strike the cartridge when the slide or bolt is in the forward position, an extractor adapted to match the selected caliber of the cartridge, and an ejector fixed to the frame and extending into the ejection chamber when the slide is in a rearward position, characterized in that the breechblock portion defines a semi-circular groove, a bolt face insert comprising a body having central hole and a semi-circular rim adapted to removably fit into the semi-circular groove, the insert body having a breechblock side facing the frame breechblock portion and having an oppositely disposed bolt face side facing the extraction chamber when the semi-circular rim is inserted into the semi-circular breechblock groove, the insert bolt face side being adapted to match the selected caliber of the cartridge. In its preferred form the bolt face insert defines an extractor groove adapted to receive the extractor, and the insert also defines a longitudinal ejector slot adapted to receive the ejector.

Brief Description of Drawings

The invention will be better understood by reference to the following

description, taken in connection with the accompanying drawings, in which:

Fig. 1 is a side elevational drawing, partly in section, of portions of a semi-automatic firearm, according to the present invention,

Fig. 2 is a top plan view of the firearm of Fig. 1,

5 Fig. 3 is a side elevational view of the slide of Fig. 2,

Fig. 4 is a bottom plan view of the slide of Fig. 2,

Fig. 5 is a cross-sectional view of the slide, looking in the direction of arrows V - V of Fig. 4,

10 Fig. 6 is a cross-sectional view of the slide, looking in the direction of arrows VI - VI of Fig. 4,

Fig. 7 is a bottom plan view of a bolt face insert according to the present invention,

Fig. 8 is a front elevational view of the bolt face insert,

15 Fig. 9 is a side elevational view of the bolt face insert,

Fig. 10 is a front elevational view of the bolt face insert similar to Fig. 8,

Fig. 11 is a top view in cross-section taken along lines A - A of Fig. 10, and

20 Fig. 12 is a front elevational view in cross-section of a slide modified to accept the bolt face insert.

Best Mode of Carrying Out the Invention

Referring now to Fig. 1 of the drawing, the invention is described as embodied in a semi-automatic firearm 10 of the type using a spring-loaded cartridge magazine (not shown) and having a reciprocating slide 12 adapted to move from a forward position in a rearward direction against a recoil spring (not shown) when a cartridge 14 is fired. During the rearward movement, the shell of cartridge 14 is ejected, and during the return forward movement, a new cartridge is stripped from the magazine by the extractor and inserted into the

bore of a barrel 16 in a manner well known in the art. Slide 12 is reciprocable in tracks upon a frame 18. A hammer 20 is pivotably mounted on frame 18 to strike a firing pin 22, which is longitudinally slid able in the slide 12 so as to strike the rear of cartridge 14. A trigger 24 is pivotably mounted in the frame 5 and connected to push or pull a transfer bar 26. Slide 12 includes a cam surface 28, which cooperates with a finger 30 to raise or lower the end of transfer bar 26 and release the hammer, when the transfer bar is pushed or pulled longitudinally by the trigger 24.

The firearm of Fig. 1 is shown with the slide 12 in a forward position, 10 with hammer 20 cocked. A bolt face insert 32 located at the end of a solid breechblock portion of the slide is adjacent and receives the rear of cartridge 14. An extractor (not shown) is engaged over the back end of the cartridge casing ready to cooperate with an ejector (not shown) in a manner well known in the art to remove the casing from the barrel bore and eject the casing through 15 an opening in the slide during movement to the rearward position of the slide.

The invention is an improvement in a construction for a semi-automatic hand held repeater known in the prior art. It is important to note that the bolt face area of a prior art slide is an integral part of the slide and dimensioned for a particular caliber. Converting to a different caliber would require a different 20 slide for the firearm.

Referring to Figs. 2 - 6 of the drawings, a slide 12 according to the present invention is shown. Fig. 2 shows a top view of the slide with sighting ridges 34 and an ejection port 36. Indicated on the rear end of the slide are 25 grooved flanges 35, 37, which receive mating flanges on the frame 12 to hold the slide and guide it in a longitudinal direction on the frame.

Fig. 3 is a side view of the slide indicating ejection port 36, an extractor 38 and a safety pin 40. The separate bolt face insert, to be later described in detail, is indicated by reference number 32.

Fig. 4 is a bottom plan view of the slide 12. The slide includes a solid

breechblock portion 42 and a longitudinally disposed extraction chamber 44.

A longitudinal hole 46 extends through the solid breechblock portion 42 to accommodate a sliding firing pin (not shown).

Referring to Fig. 5 of the drawing, taken along section V - V an extractor is shown at 48 as well as the ejection port 36 and portions 50 of a cartridge magazine holding a cartridge 14. Beyond the cartridge 14 the bolt face insert 32 is seen disposed in the slide 12.

Referring to Fig. 6 of the drawing, taken along section VI - VI, bolt face insert 32 is shown disposed in the slide 12. The extractor is removed from the view to reveal an extractor spring well at 49.

Referring now to Figs. 7 - 11, various views of the bolt face insert according to the present invention are shown. The bolt face insert, shown generally at 32 has a body 54 with a semi-circular rim 56 and a central hole 58, both coaxial with an axis 59. Central hole 58 is located so as to be aligned with the hole 46 in the breechblock portion 42 when the bolt face insert is disposed in the slide.

In accordance with one aspect of the present invention, the bolt face insert 32 is provided with an extractor groove 60 cut through the rim 56 extending perpendicular to axis 59 and adapted to receive an extractor (Fig. 5).

The bolt face insert 32 is further provided with a longitudinal ejector slot 62 through the body extending parallel to axis 59 and adapted to receive the ejector (not shown). The ejector is fixed to the frame so that it will pass through ejector slot 62 when the slide moves, and eject the casing through ejection port 36. As indicated in the cross-section of Fig. 11, the bolt face insert 32 has a breechblock side 64 and a bolt face side 66. The bolt face side 66 is especially configured to receive the rim of a specific caliber cartridge, for example by properly dimensioning the bolt face side with the proper diameter 67 as seen in Fig. 10.

Referring to Fig. 12 of the drawing, a cross-section is indicated of the

firearm slide 12. In almost every respect, slide 12 is like a prior art slide, except that it is modified to include a semi-circular groove 70 which is cut into the end of the slide 12 adjacent the end of solid breechblock portion 42 (see Fig. 4). Groove 70 is preferably cut coaxial with the central hole 46 in the breechblock and is of the proper dimension to receive the semi-circular rim 56 of the bolt face insert, so that breechblock hole 46 will line up with insert hole 58.

According to the present invention, the exterior dimensions of the semi-circular rim of the bolt face insert are always the same, whereas the bolt face side 66 of the insert 32 is configured according to a selected caliber size. Therefore it is only necessary to substitute one bolt face insert for another, and to substitute a different extractor, magazine and barrel in order to change the caliber of the firearm.

While there has been described what is considered to be the preferred embodiment of the invention, other modifications will occur to those skilled in the art. It is desired to secure all such modifications as fall within the true spirit and scope of the invention.

Claims

1. An improved bolt face for a firearm of the type having a frame defining a longitudinally extending ejection chamber, a barrel having a bore adapted to receive a cartridge of a selected caliber disposed in the frame, a slide or bolt arranged to move longitudinally between a forward and a rearward position with respect to said frame and said barrel, said slide or bolt defining a breechblock portion having a longitudinal hole therethrough, a firing pin longitudinally slidable in said longitudinal hole to enable it to strike the cartridge when the slide or bolt is in the forward position, an extractor adapted to match the selected caliber of the cartridge, and an ejector fixed to the frame and extending into said ejection chamber, **characterized in that:**

said breechblock portion defines a semi-circular groove coaxial with said longitudinal hole,

15 said firearm having a bolt face insert comprising a body defining a semi-circular rim adapted to removably fit into said semi-circular groove,

20 said body having a breechblock side facing the frame breechblock portion and having an oppositely disposed bolt face side facing the extraction chamber when the insert rim is inserted into the breechblock groove, and

said insert bolt face side adapted to match the selected caliber of said cartridge

2. The combination according to Claim 1, wherein said bolt face insert further defines a longitudinal ejector slot located and dimensioned to receive said ejector when said slide or bolt move to a rearward position.

3. The combination according to Claim 1, wherein said bolt face insert further defines an extractor groove adapted to receive said extractor.

4. The combination according to Claim 1, wherein said bolt face insert further defines a central hole therethrough located in the body so as to be aligned with said longitudinal hole in said breechblock portion when the insert
5 rim is inserted into the semi-circular groove.

5. A bolt face insert for providing a readily changeable bolt face for a firearm, said bolt face insert comprising a body having a longitudinal axis and defining a semi-circular rim disposed about said axis, said body defining a hole therethrough along said axis, said bolt face insert defining a longitudinal ejector slot through said body extending parallel to said axis, and said bolt face insert further defining an extractor groove through said semi-circular rim extending perpendicular to said axis.
10

1/3

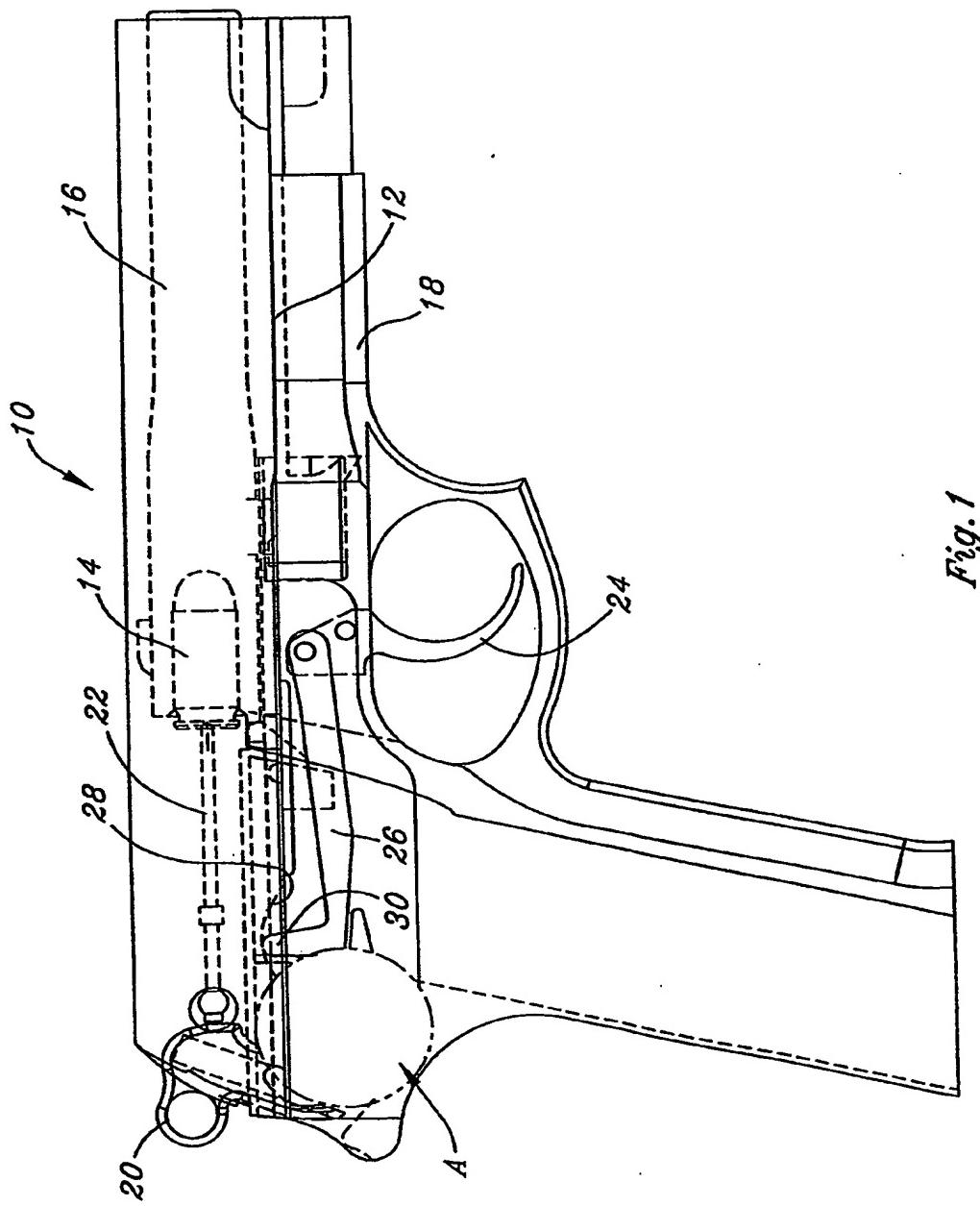
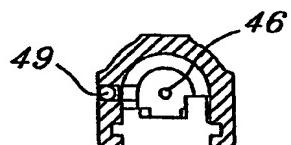
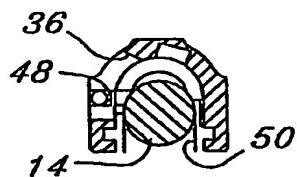
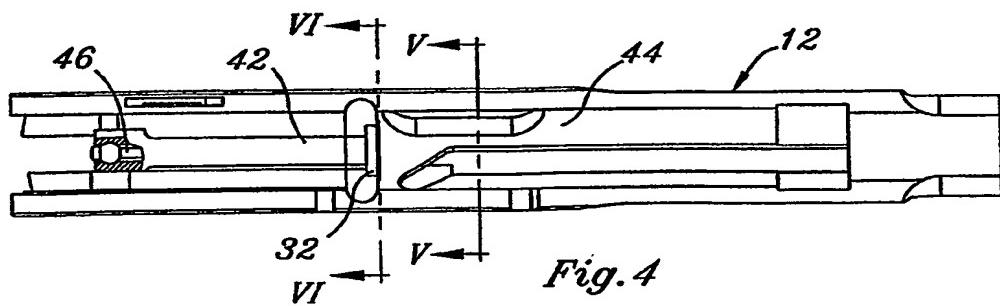
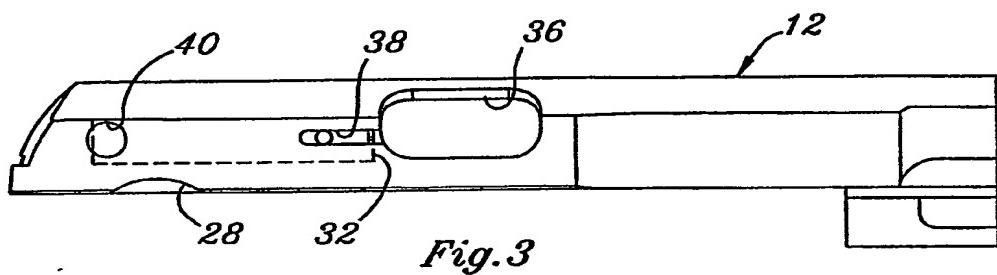
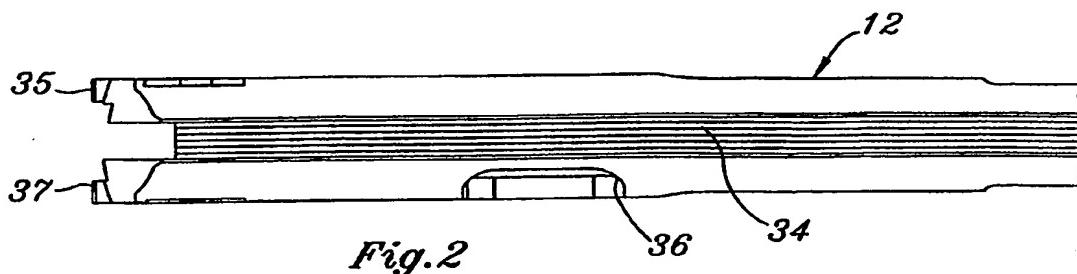


Fig. 1

2/3



3/3

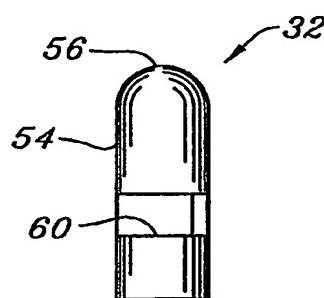


Fig. 9

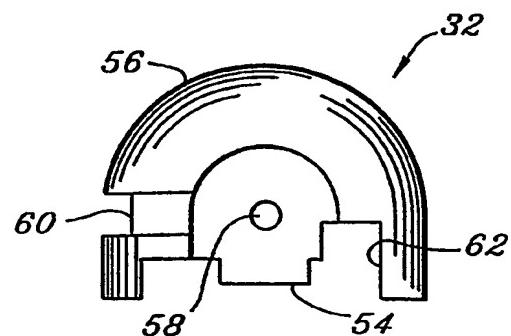


Fig. 8

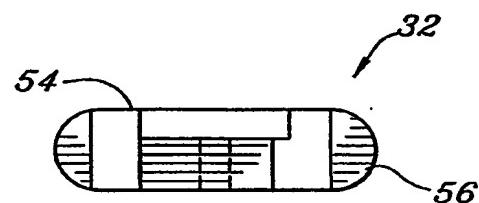


Fig. 7

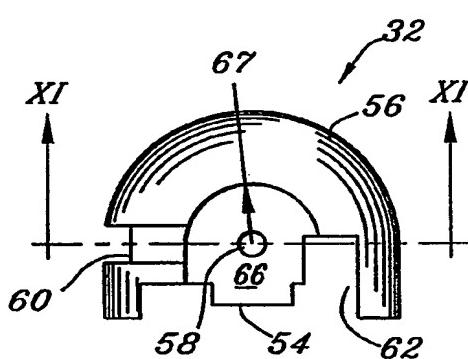


Fig. 10

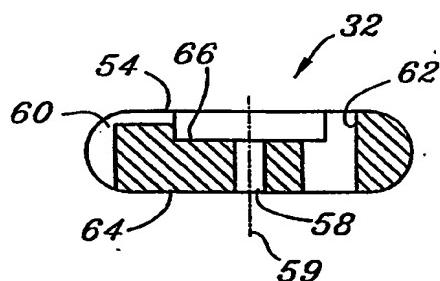


Fig. 11

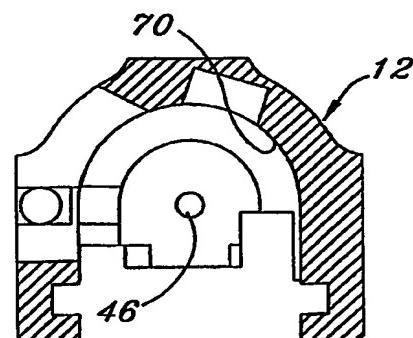


Fig. 12

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/30471

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : F41A 3/12
 US CL : 42/16, 17; 89/17

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 U.S. : 42/16, 17, 18, 20; 89/17

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
 BRS text search

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4, 942, 802 A (STONER) 24 July 1990 (24.07.1990), see Figs. 7-8 and associated written description	1-5
X	US 3, 996, 684 A (BAUMAN ETAL.) 14 December 1976 (14.12.1976), see Figs. 4-8 and associated written description	1-5
X	US 3, 728, 939 A (WILHELM) 24 April 1973 (24.04.1973), see Fig. 1 and associated written description	5
X	US 4, 617, 749 A (JUREK) 21 October 1986 (21.10.1986), see Fig. 10 and associated written description	5

 Further documents are listed in the continuation of Box C.

See patent family annex.

• Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means		
"P" document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search

13 January 2004 (13.01.2004)

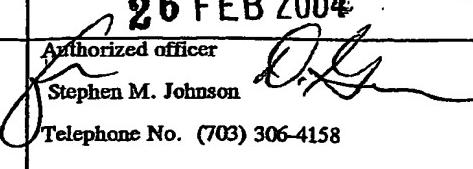
Date of mailing of the international search report

26 FEB 2004

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US
 Commissioner for Patents
 P.O. Box 1450
 Alexandria, Virginia 22313-1450
 Facsimile No. (703)305-3230

Authorized officer


 Stephen M. Johnson

Telephone No. (703) 306-4158